

Knowledge EDGES: Collaborative Faculty Teams to Mobilize Knowledge about Teaching

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Faculty addressing instructional challenges need to explore the breadth of innovations in teaching that could be of value to them. The Knowledge EDGES approach creates virtual teams of faculty across institutions, to mobilize the knowledge base about teaching in their subject area. Teams collaborate in exploring relevant knowledge on innovative teaching practices, individually adapt knowledge for their own courses, share results, and create a legacy of knowledge products on which future faculty teams can build.

1. Background

Cooperative faculty innovation teams to mobilize the knowledge base about teaching in their subject area have their academic roots in programs of the William and Flora Hewlett Foundation and the Carnegie Foundation for the Advancement of Teaching (e.g., SPECCⁱ, CASTLⁱⁱ, OERⁱⁱⁱ), in research for the Higher Education Quality Council of Ontario and eduSource Canada, and in related programs in Australia and the U.K. The model for cooperative faculty innovation teams also applies insights about computer-supported collaborative work and knowledge mobilization, including contributions from the Institute for Knowledge Innovation and Technology at the University of Toronto, the Collaborative Knowledge Networks research project at MIT, and the Canadian Centre for Knowledge Mobilization.

The integration of these streams of development provides an opportunity to increase the return on investments in faculty inquiry and innovation, to support sustainability and as a model for student engagement with knowledge mobilization and innovation.

California programs:

- a pilot launched in Spring term 2008 for the California State University's *Transforming Course Design* initiative^{iv}, with teams in Developmental Mathematics and General Chemistry; members of these teams have continued to interact throughout Fall 2008 and Spring 2009, and released a public version of their team workspaces^v as part of disseminating their results;
- an adaptation for Developmental Mathematics faculty in California Community Colleges sponsored by the William and Flora Hewlett Foundation – FACCTS: Faculty Collaborations for Course TransformationS^{vi} – in conjunction with the

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CCC Basic Skills Initiative. An initial team in the San Diego area launched in Spring 2009; teams in the Los Angeles Community College District and in the San Francisco region are being launched in Fall 2009.

Ontario (Canada) programs:

The following innovation teams are part of the Knowledge Mobilization for Exemplary Teaching and Learning^{vii} program within the Higher Education Quality Council of Ontario:

- a pilot project in Developmental Mathematics for community colleges in Ontario, launched in Spring term 2009;
- a pilot project for universities in Ontario, launching in Summer 2009 with two cooperative faculty innovation teams transforming program practices for developing, demonstrating and documenting student capabilities for the Undergraduate Degree Level Expectations of the Council of Ontario Universities;

2. Team Goals

Each cooperative faculty innovation team will include faculty members from multiple institutions, supported by online collaboration facilities and scheduled meetings (mostly distributed). The knowledge and resources discovered and generated in the team collaborations will be selectively applied by all faculty team members in their own courses and programs, i.e., there is no expectation for a common course or curriculum structure. We assume that the context, needs and capabilities of our students and our institutions are distinctive factors in determining how to best enhance the learning experience and student success.

The **primary** goal of the cooperative faculty innovation teams is to enhance the student learning experience and student success in a shared area of their subject domain or instructional approach. The emphasis for the teams is to mobilize the knowledge base about teaching and learning in their subject area, by cooperative exploration, adaptation, application, evaluation and dissemination of a diversity of knowledge resources: the wisdom of expert teachers, evidence from research, and exemplary pedagogy embedded in open educational resources. The principal advantage of a cooperative approach is that it allows faculty team members to engage with this knowledge base in more depth and breadth than would be possible for individuals.

A secondary **personal** goal of the team members is to augment their own capabilities, in learning-centered design, faculty inquiry and scholarship, and/or knowledge mobilization for exemplary teaching.

Each team is also expected to document the pedagogical content knowledge used in their projects, to make the educational resources created available for reuse and adaptation, and to share evaluation results within the team and beyond. This creates a team **legacy** to support

ongoing knowledge exchange with (and knowledge mobilization by) other faculty colleagues. The cooperative team approach has three advantages for achieving this goal:

- the team provides a circle of trust and commitment as a safe space for initial sharing of products and results;
- team members have to consider the aspects of their local context which might make their products and results more or less relevant for other team members. This can lessen the impacts of these local factors on the resulting legacy products, which can otherwise be a major impediment to re-use and adaptation [Penny Light et al, 2007];
- because most of the team interactions occur online, the instructional rationale behind the revised course designs and resources has already been partly document via these interactions within the team.

Finally, the team members advance the work of the sponsors and support team in ongoing **enhancement of the model**, to develop more effective ways for faculty to share and adapt exemplary teaching practices and resources.

3. Team Structure

Faculty: Two or more team members from each of 5 -7 institutions. All faculty members on the team share a common subject area identity. The members from each institution are commissioned by their department to enhance student success in a specific area through course redesign and transformation.

Support team: the following roles require some specific experience, knowledge and skill outside the subject area for the team^{viii}:

- *Teamwork Catalyst:* insures smooth logistics of meetings and workspace; updates home page in team online workspace; acts as ‘mayor’ of online space to acknowledge contributions, etc.; fosters interactions amongst individual team members; monitors participation for early detection of disengagement^{ix}.
- *Knowledge Concierge:* advises team members on sources of knowledge relevant to their tasks, including ‘the wisdom of practice’, insights from research, and exemplary open educational resources; advises team members on knowledge synthesis, knowledge mobilization, evaluation, etc.; consults with educational developers at the partner institutions^x.
- *Legacy Resources Catalyst:* identifies and supports opportunities to fulfill the legacy goals of the cooperative faculty innovation team;
- *Relationship Coordinator:* supports faculty team members in communicating with colleagues and academic leaders within their own institutions; interacts with supporting strategic initiatives at the system level; develops linkages with complementary initiatives^{xi}.
- *Evaluation Lead:* we make the point with each team that the mandate of the Evaluation Lead is ‘evaluation for improvement’ on the structure and processes of the collaborative faculty innovation team model, and not on the team members’

courses. Courses at each institution are evaluated by the faculty involved, not by us (although the Evaluation Lead can serve as a resource on request).

4. Team Processes

Each cooperative team will establish its own schedule of activities and division of labor. A prototype schedule provides guidance, e.g., here is the default schedule used for the Design and Development phase by teams in Spring term 2008. The schedule is used to illustrate the Knowledge EDGES process: each college team and each cooperative faculty innovation team adapt these activities to meet their needs, and the process is always a spiral of deeper engagement rather than a sequence through the activities.

January	<i>Launch meeting [on-site, at least 6 hours].</i> Analyze current and target course outcomes, and evidence concerning student subgroups sharing common characteristics and learning challenges.
February	Explore relevant exemplary practices, pedagogical content knowledge, adaptable resources and research insights; Synthesize knowledge from these sources on the issues of interest;
March	Discover which exemplary teaching practices and resources are most relevant for the target courses; Generate revised course structure and resources to promote more effective student learning activity. <i>Optional mid-term on-site meeting</i>
April	Generate selected resources, integrate into revised course, and document the instructional rationale to aid in reuse and adaptation.
May	Incorporate resources and activities developed by other team members
June	Plan for implementation and evaluation in next course offering. <i>On-site meeting to conclude design and development phase.</i>

In the following term, team members cooperate (less intensively) in an *Implementation, Evaluation and Dissemination* phase, with the following tasks:

- Offer the transformed course(s) and monitor changes in student learning experience;
- **Evaluate** course results in an *Evaluation for Improvement* mode;
- **Share** with other team members, to report progress and challenges;

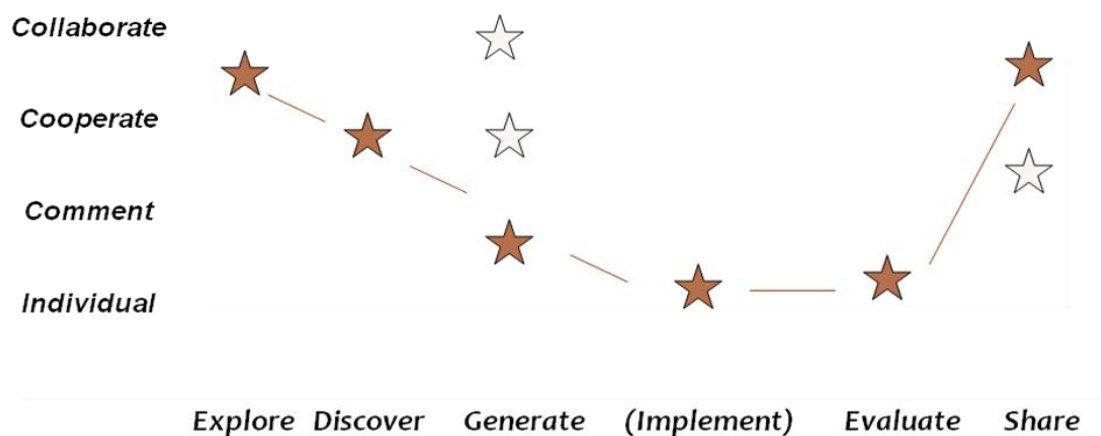
- Support mobilization of the knowledge and resources the team members have applied and created in the project.

This *Design and Development* phase is supported by team meetings using phone + online spaces (e.g, Eluminate™, CCCConfer™). Teams typically elect to meet weekly at first, and then biweekly once team rhythms and relationships are established. In the subsequent *Implementation, Evaluation and Dissemination* phase, teams typically elect biweekly or monthly distributed meetings to share experiences and to plan further cooperative work.

5. Levels of Cooperation in Knowledge EDGES processes

As noted in Section 2, one of the key advantages of a cooperative faculty innovation team is an opportunity for the faculty involved to engage with the knowledge base about teaching and learning in their subject areas in more depth and breadth than would otherwise occur if they were working as individuals or just within their college projects. Figure 1 outlines the different levels of shared work which occur across college projects during the team activities.

Figure 1: Levels of Collaboration in Knowledge EDGES Processes



Collaboration: Most of the truly collaborative work across colleges² – joint effort toward a common product – occurs at the beginning and end of the team processes. During the *Explore* activities, the members can decide to investigate specific knowledge sources and report back to the team or contribute to a team knowledge synthesis. During the *Sharing* of results, team members work together to insure the evaluation activities have

² Of course, team members from the same college collaborate throughout their project.

investigated the local versus generalizable factors which may have contribute to the results, and collaborate on presentations and resources for their colleagues beyond the team. Occasionally, there may be sufficient common goals across college teams for them to *Generate* shared products, e.g., faculty across colleges identified a common interest in Environmental Sustainability as a motivating theme in mathematics courses, which allows them to integrate more effort across colleges. In another case, faculty developing learning activity resources collaborated on a common format for the learner and instructor handouts.

“This project has opened our eyes to the wealth of resource material available to help build more effective learning environments. We realize now that many of our colleagues are in the same predicament as we experience and we are finding that the communication within the team is helping us cope with some of these issues.”

Cooperation: Cooperative work involves coordination of related but distinct products. This typically occurs when team faculty identify a common challenge in which different solutions seem more aligned with the local context, e.g., several faculty using group work to increase student engagement chose different group formats and processes, sharing approaches during the *Discover* activities with the intention of comparing results and evolving toward a set of exemplary practices. Cooperative activities can also *Generate* a set of open educational resources, e.g., the faculty mentioned above who collaborated on a common format for resources also divided up the work across topics and application areas to produce a large set of shared exercises for students.

“Working with others on the team helps to confirm some of the things that I'm doing well, in addition to giving me ideas of other things to try.”

Comment: All team members are expected to contribute to the success of other college projects by sharing their expertise through comment on the emerging project plans. For example, recent teams using the Knowledge EDGES process contributed on average one comments per team member per month on the work of others. The depth varied from an anecdote about a personal experience to a multi-page set of suggestions to make a proposed learning activity more reusable at other colleges.

“Thanks for these comments! I have incorporated many of your suggestions and am still considering some. In particular, I like the idea of incorporating a clearer set of learning objectives to each of the labs. So we think we are going to add 'learning objectives' to the notes on all of them.”

6. Knowledge EDGES as a Cooperative Process for Knowledge Mobilization

Beyond the collaborative and cooperative activities within the teams, the process steps can also lead to the mobilization of the knowledge base about teaching and learning in the team members' subject area. Within the Canadian context, there is increasing

emphasis on the role of Knowledge Mobilization as a part of the research enterprise. However, it is much less common for faculty to pursue knowledge mobilization in their role as teachers.

There are three categories of knowledge which faculty on our teams have explored, selected as relevant and contextually appropriate, and mobilized in new course designs:

- ‘the wisdom of practice’ [Bransford et al, 1999], as recorded in case studies, experience reports and teacher reflections;
- evidence from research, from studies of teaching and learning in their own discipline to more general results about student group work and technology tools;
- pedagogical content knowledge embedded in open educational resources.

For example, one of the faculty mentioned above who is interested in Environmental Sustainability as a theme within mathematics courses discovered exemplary practices in a case study of integrative learning at San Mateo College [Burke, 2006], research insights about how mathematics students conceive of environmental issues [Reid and Petocz, 2006], and reusable resources with mathematics applied to wind energy sources and to global climate change [KidWind 2007; SENCER, 2008].

Many additional mathematics resources have been explored and applied by team members, including many case studies, individual teacher’s reflections, and learning activities made available on the Internet. More general research studies applied by our college project include a research study of student pathways [Orpwood et al, 2008], a questionnaire developed to measure Learner Characteristics [Artelt et al, 2003], and a research study on the use of Personas [Pruitt and Grudin, 2003].

A key factor limiting the mobilization of the knowledge base about teaching is the faculty members’ conception of the knowledge base and their own knowledge as teachers [Hativa et al, 2002]. Some team members will be more familiar with acquiring knowledge about teaching through direct experience rather than from an explicit knowledge base of exemplary practice, research evidence and adaptable resources. The first approach reflects a conception of teaching as a craft; the second approach extends this to conceive of teaching as a profession with an explicit representation and organization as a body of knowledge [Hiebert, 2002].

A craft knowledge perspective can restrict faculty success in exploring external knowledge sources and determining appropriate solutions for their context from a menu of possible approaches (rather than a single ‘better’ or ‘best’ approach to compare against their current practice). On the other hand, direct suggestions from other team members are still effective for these instructors right from the start of the team process, since they are more in keeping with the craft knowledge paradigm.

Many team members find that their engagement on the team leads to a better appreciation for the professional knowledge base about teaching in their discipline, and to the subsequent evolution of their identity as teachers toward a more professional model. The weblogs associated with the programs sponsoring our faculty innovation teams contain

further reflections on the complementary roles of craft knowledge and professional knowledge for teaching in higher education [Carey, 2009].

7. Conclusions and Further Research

We are continuing the development of the Knowledge EDGES process for cooperative faculty innovation teams. The original model was influenced by research on cooperative innovation teams in industry [Gloor, 2006]; two new teams in Fall 2009 will engage with a revised process based on the insights described in this paper.

In parallel with advancing the Knowledge EDGES process for short-term project team collaboration, we are also developing additional levels of engagement to promote knowledge exchange and knowledge mobilization for exemplary teaching and learning:

- faculty with an *ongoing* mutual engagement in a learning/inquiry community to enhance the learning experience and student success in their own courses and as a support/management community for a *Teaching Collaboratory*
- faculty who participate *periodically* in knowledge mobilization for their own teaching and become contributors to the *Knowledge Exchange Network*, motivated by a spirit of reciprocity and by community engagement initiatives;
- faculty who occasionally access the knowledge base on teaching through the a *Resource Collection* to improve their courses, but who do not typically contribute from their own expertise to extend those resources.

There are also larger issues of Professional Identity affecting how faculty contribute in project teams and in these larger community exchanges. As noted in the previous section, we are currently focusing on ways to develop a stronger professional conception for pedagogical content knowledge. For some team members, their experience on a cooperative faculty innovation team has been transformative vis-à-vis their shift from a craft knowledge paradigm to a professional knowledge paradigm, but we should consider these as exceptions given the duration and intensity of the team's interactions. A longer term perspective and longer term initiatives are required to take full advantage of the opportunities for faculty share knowledge and collaborate on enhancements to student success and the quality of their learning experiences.

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Endnotes

ⁱ <http://www.hewlett.org/programs/education-program/improving-education-in-california> ;
<http://www.carnegiefoundation.org/programs/index.asp?key=26>; accessed May 15 2009

ⁱⁱ <http://www.carnegiefoundation.org/programs/index.asp?key=21>, accessed May 15 2009

ⁱⁱⁱ <http://www.hewlett.org/oer>, accessed May 15 2009

^{iv} **Strategic Initiatives:** note that each of these project settings has been positioned within a longer term strategic initiative at the institutional or system level. This provides the context for the Legacy Goals, which are important factors in the beneficial return on investment for project sponsors.

^v <http://groups.google.com/group/csu-transform-dev-math-teams>
<http://groups.google.com/group/csu-transform-general-chemistry-teams>
Note comments in Section 6 on the cumbersome nature of these workspaces for sharing beyond the teams

^{vi} <http://facctsdevmath.edublogs.org/>

^{vii} <http://kmetl.heqco.ca>

^{viii} Note: one support team member can fulfill various roles; a role can be shared within the support team, etc.

^{ix} In the CCC FACCTS teams in Fall 2009, we will be using one of the San Diego team members from Spring 09 in this role, as a ‘pay it forward’ support model.

^x This role is similar to the Inquiry Coach role in Faculty Inquiry Networks, <http://facultyinquiry.net/about-fin/>. Our team members have found the term ‘concierge’ appealing, with the analogy of the helpful hotel staffer who gets you resources and services otherwise out of your reach.

^{xi} E.g., for the Developmental Math projects within the California community colleges, the following complementary initiatives and partner groups were identified as needing to be in the loop: the California Math Council Community Colleges, the Community College Consortium for Open Educational Resources, the American Mathematical Association group for Two Year Colleges, the Math Digital Library pathway within the National Stem Digital Learning, and the Faculty Inquiry Groups Network